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The Relationship of Personality Characteristics, Awareness, and Attitude in a Verbal Conditioning Situation

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THE RELATIONSHIP OF PERSONALITY CHARACTERISTICS, AWARENESS,
AND ATTITUDE IN A VERBAL CONDITIONING SITUATION

by

Sister M. Austin Doherty, O.S.F.

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Master of Arts

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1965

LIFE

Sister M. Austin Doherty, O.S.F. was born in Chicago, Illinois, August 10, 1927. She was graduated from Alvernia High School, June, 1945, and attended Loyola University part-time from 1945 to 1950. In December, 1951, she entered the community of the School Sisters of St. Francis and was professed as a Religious in June, 1954. At that time she also received the degree of Bachelor of Arts with a major in history from Alverno College, Milwaukee, Wisconsin. In June, 1960, she received the degree of Master of Arts in history from Marquette University, Milwaukee, Wisconsin.

From 1954 until 1963 she taught history in high school and college. In September, 1963, she was granted leave of absence from Alverno College for full-time graduate study in psychology at Loyola University, Chicago, Illinois.

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CHAPTER I

INTRODUCTION

Since the initial experiments of Taffel (1955) and Greenspoon (1955) the question of verbal conditioning, or learning without awareness, as it was originally called, has become increasingly more complex. In ten years of experimentation, the focus has shifted several times. Preoccupation with the phenomenon itself and related personality characteristics gave way before the quest of awareness as a concealed variable in the experimental situation. Concentration on levels of awareness and the development of methods of assessing the subject's conscious awareness dominated the literature during 1961 and 1962. More recently the focus has been on investigating the complex relationships between the subject's awareness, complexity of the task, examiner variables, influence of instructions, and atmosphere of the experimental situation.

It will be recognized that most of these factors are peculiar to a human conditioning situation and yet most of the research is based at least implicitly on the Skinnerian paradigm of operant conditioning (Skinner, 1957). Although it is not possible to discover the level of the animal's "awareness" of the relationship between the conditioned operant (e.g. bar pressing) and the reinforcing stimulus (e.g. food pellet), it has been demonstrated that changes in the reinforcing stimulus do produce changes in

the animal's behavior, and often according to a predictable, lawful pattern. In the analogous verbal conditioning experiments subjects increased their responses to the reinforcing stimulus without seeming to be aware of its relationship to the preceding conditioned operant. The relationship to animal operant conditioning seemed to be clearly demonstrated.

Primarily through the work of Spielberger and Dulaney, however, the role of awareness in the verbal conditioning situation was explored. Subsequent experiments indicated that where awareness had been carefully investigated there was evidence that there was no learning without awareness.

These conclusions in turn have focused attention on the definitions of the two terms learning and awareness. Learning, in the verbal conditioning experiment, is operationally defined either as the emission of the reinforced response class, the unconditioned response in Skinnerian operant conditioning, or awareness of the correct contingency, recognition of the relationship between the conditioned operant and the reinforcing stimulus. At present for most investigators the accepted operational definition of awareness is verbalization of the correct contingency. The problem of eliciting this report without inducing awareness has proved to be a sensitive one in interviewing.

As Farber (1963) pointed out, however, in spite of the clarification of this relationship between awareness and learning, experiments did not give evidence of any clearcut relationship between improvement in performance and ability to report the reinforcement contingency. Obviously there are other factors operating in these experiments which have not been

sufficiently studied. It is reasonable to assume that among these factors are personality characteristics.

Differences in personality characteristics may be presumed to exist between those subjects who become aware and those who remain unaware in the experimental situation and also between those subjects whose awareness does not induce an increase in the reinforced response and those whose awareness is positively related to increase of the critical response.

Investigators interested in this area have attempted to specify the relationship between personality characteristics and verbal conditionability, treating the problem of awareness only incidentally or eliminating the profiles of aware subjects from statistical analysis. This is primarily true of those investigators who hypothesized learning without awareness. Among experimenters investigating the phenomenon of awareness very few have analyzed the subjects in terms of personality characteristics. Those who have did not discover significant differences between groups. In all these cases a restricted number of personality variables have been selected, either on an a priori basis or because of their relevance to a successful psychotherapeutic relationship. Results have been confusing, in many instances contradictory, and in general inconclusive.

The special focus of this thesis is an investigation of the personality variables of those subjects who do not become aware of the correct contingency in a relatively simple verbal conditioning experiment, or who, having become aware, do not improve their performance, as measured by an increase in the number of conditioned responses.

CHAPTER II

REVIEW OF THE LITERATURE

Since the focus of this thesis is the relationship between awareness-unawareness and personality characteristics, the following review is limited to articles and reports of experiments in this area. An appreciation of the extent and variety of research in this field can be gleaned from the number of lengthy review articles which have appeared in recent years. Among the most comprehensive are Greenspoon (1962), Krasner (1958), Salzinger (1959) and Williams (1964).

This review will consider first those experiments dealing with verbal conditioning and the personality characteristics of anxiety, autonomy, need for approval, sociability and others and, second, those experiments investigating awareness in a verbal conditioning situation. When awareness is not mentioned in the following experiments, it will indicate that no mention of this variable was made in the original report.

Since anxiety plays a key role in interpersonal relationships more studies have investigated this aspect of personality than any other. Taffel's (1955) pioneer work and Sarason's (1958) study of neurotics and psychotics yielded a positive correlation between measures of anxiety and rate of verbal conditioning. In Sarason's study no Ss were aware of the correct contingency and only seven of 60 Ss noticed the E's reinforcement.

Later experiments by Farber (1963), Levin (1961), and Eriksen, Kuethé and Sullivan (1958), however, failed to find any relationship between anxiety and conditioning; neither did they establish any relationship between anxiety and awareness. These contradictory findings may be due to differences in subjects--normals vs. neurotics and psychotics--and in measures of anxiety--Test Anxiety Questionnaire (Sarason, 1958), MAS (Farber 1963; Levin, 1961; Taffel, 1955) and Psychasthenia Scale of the MMPI (Eriksen et al., 1958).

On an a priori basis, autonomy is believed to be negatively related to conditionability generally. Investigations by Kirman (1958) and Levin (1961) have failed to establish such a relationship. Babledelis (1961) reported a significant negative correlation only between autonomy and verbal conditioning when positive self-references were reinforced but not when negative self-statements were reinforced. Her results contrasted with Rogers' (1960) finding of a significant conditioning effect for reinforced negative self-statements but not for positive self-statements.

Vestre (1962) in a study of hospitalized schizophrenics found a significant negative correlation between persons high on the Autonomous Scale of Edwards Personal Preference Schedule and conditionability but his results are open to question because of the arbitrary score by which he chose to establish conditioning (increment across blocks as opposed to decrement across blocks).

Elimination from statistical analysis of the profiles of four ss who were aware of the correct contingency also makes it difficult to compare his results with other investigations.

Although Cairns and Lewis (1962) found no statistical evidence of conditioning, they discovered a significant relationship between dependency scores and increases in the critical response; and between dependency scores and positive attitude toward reinforcement. In spite of the latter finding, however, there was only a minimal increase in emission of the critical response for these subjects. Unfortunately Cairns and Lewis do not mention the existence of awareness among their subjects. Since the critical response was either a verb denoting aggression or a verb denoting dependency, the analysis of awareness might have clarified the relationships existing between the dependency variable and conditioning.

Closely related to these findings is the result reported by Gelfand (1962) that self-esteem and conditioning are negatively correlated. Gelfand's design included experiences of success and failure for the experimental groups which yielded the finding that subjects exposed to experiences inconsistent with their customary self-evaluations (high self-esteem--failure and low self-esteem--success) showed significantly more verbal conditioning than those whose experiences were consistent with self-attitudes. Unfortunately neither the question of anxiety nor the problem of awareness was included in this study.

Related to the above studies of a negative relationship between autonomy and conditionability have been a series of investigations into an alleged positive relationship between need for approval and conditionability. Results have been similarly confusing. Spielberger, Berger, and Howard (1963) found no correlation between the two but Marlowe (1963) and Crowne and Strickland (1961) discovered a significant positive correlation.

In the Spielberger et al. (1963) experiment the status of the experimenters, who were graduate assistants, may have been a factor in the results. It was not possible for this group to evaluate statistically the relationship between need for approval and awareness but there was a "strong suggestion" that they were not related.

In Marlowe's (1963) study no subjects were aware of the correct contingency although 27 of the 38 experimental subjects noticed the reinforcement and felt it signified interest or encouragement. In the Crowne-Strickland (1961) investigation the profiles of sixteen subjects who were judged to be aware were eliminated from the analysis. No differences were discovered between the high and low need for approval groups and awareness, although it is interesting to this investigator that 15 of the 16 aware subjects were from the condition which received a negative reinforcement.

In a very recent study on this same variable Epstein (1964) discovered a complex relationship between need for approval, awareness, and the reinforced contingency--hostile and neutral verbs. All subjects conditioned except low need for approval on hostile verbs. More subjects in the low need for approval group were aware in the neutral verb condition and more high need for approval subjects were aware in the hostile verb group. It is possible to speculate that subjects were more sensitive to hostile responses and thus more aware.

A few studies on isolated personality variables have yielded significant relationships in the predicted direction. Eysenck (1959), in an experiment with neurotics, found greater conditionability among

introverts than among extroverts, as measured by the Maudsley Personality Inventory, although conditioning occurred in both. In a replication of the study with normals, McDonnell and Inglis (1962) discovered that although the group as a whole conditioned, no significant correlation was found between the introversion-extroversion scores and conditioning scores. A possible explanation of the failure to replicate Eysenck's results may be found in the selection of the groups by McDonnell and Inglis. The latter experiment included a population normally distributed according to the Maudsley Scale whereas Eysenck's group was dichotomized into extremes on the scale.

Krasner, Ullmann, Weiss and Collins (1961) found a positive relationship for their 48 male Ss between achievement via independence, as measured by the California Psychological Inventory, and conditioning and a negative relationship between hostility and conditioning, and a negative, but not significant, relationship between hypnotizability and conditioning. Awareness was determined by an open-ended interview by the E. Of the three Es, two were male Ph.D.'s and one a female A.B. None of the female E's subjects was aware, nor did any condition. Among the aware Ss, the average number of critical responses--emotional words in a TAT-like situation--was slightly lower than among unaware Ss. All of these factors seem to indicate a variable of attitude or atmosphere interacting with awareness.

In view of the difference noted above between results obtained by male and female Es, Sapolsky's (1960) discovery that interpersonal attractiveness and interpersonal compatibility between the experimenter and the subject were significantly related to rate of conditioning is especially

interesting. A direct comparison of results is impossible, however, because of the different designs, a Taffel design and a TAT situation, and also because of Sapolsky's employment of female Ss. No special analysis of the aware variable was made since only three Ss were classified as aware of the correct contingency.

Three final studies are worthy of brief mention in this area. Haas (1962) concluded from his investigations that the subject's underlying emotional tone, whether positive or negative, could be manipulated by verbal conditioning. In a study by Winfree and Meyer (1963) on sociability it was discovered that Ss high on sociability and those low on sociability differed significantly in their conditionability to first person singular pronouns and first person plural pronouns. Both of these studies revealed that personality characteristics were a factor in conditioning but the study by Hetrick and Haas (1962) failed to find a significant relationship in the expected directions between verbal conditioning and ego strength, psychopathy, and depression.

Although the conclusions discussed above regarding the role of anxiety, autonomy and related characteristics are contradictory, there is enough evidence to indicate a complex involvement of these factors in the verbal conditioning situation. An exploration of a broader spectrum of personality characteristics and their interactions with conditioning and awareness would seem to be called for at this time.

In the specific area of awareness and verbal conditioning Dulaney's (1961) discussion of the influence of the subject's own hypothesis regarding reinforcement contingencies focused attention on the mediating

properties of these hypotheses. In view of this active role of the aware subject, the possibility of conditioning in the Skinnerian operant sense was thus called into question. The role of awareness itself became a subject of intensive study, particularly by Eriksen (1962) and Spielberger (1962) and their colleagues.

Eriksen's (1962) experiments yielded results which indicated that there was no learning without awareness. In elaborating his theory that where cues and reinforcement are salient enough to produce learning they will not escape detection by awareness, he also holds the position that attention is inextricably interwoven with the concept of awareness.

In investigating the problem of awareness, Spielberger (1962) and Levin (1961) have focused on the necessity of an intensive interview of the subject to ascertain his degree of awareness. According to Levin (1961) the brief interview, the usual criterion of awareness, was an insensitive measure. Subjects judged aware by the brief interview did not differ significantly from controls. Only when the aware group was extended to include those classified as aware by means of the intensive interview did the aware and unaware groups differ from each other and from the control groups.

More recent studies have attempted to study awareness directly by treating it as an independent variable. Weinstein and Lawson (1963), manipulating awareness in three groups, discovered that there was no learning without awareness. They also discovered that "fully aware" Ss, who had been informed of the correct contingency during the experiment, did not reveal this awareness uniformly on several measures of detection. Krasner

and Ullmann (1963) found that reports of awareness were influenced by mild increases in threat or stress. How this is related, if at all, to the personality trait of anxiety as usually measured was not discussed.

In several of the above studies it is evident that a factor besides awareness is operative. When the subject is ego-involved, the prediction of verbal conditioning becomes more complex. Levin (1961) reported that aware Ss who evaluated the reinforcement positively achieved higher conditioning scores. The attitude of unaware Ss was not analyzed since they did not condition.

In the Krasner and Ullmann (1963) study referred to above, those Ss conditioned who were told that the emission of statements regarding personal problems--the contingency being reinforced in a TAT-like task--was an indication of empathy; whereas the Ss who were instructed that such statements revealed the S's own personal problems did not condition. This same finding was reported by Ekman, Krasner and Ullmann (1963) who also discovered that those Ss who felt more threatened in the situation revealed a greater incidence of awareness of the correct contingency.

From this discussion it is evident that there are still many unanswered questions about the relationships between personality characteristics, verbal conditioning, awareness, and attitude of the subject. In view of what has been reported in the literature the most promising leads to be explored seem to lie in the interaction of various personality characteristics in subjects who can be differentiated along lines of awareness and attitude toward reinforcement. This is the area of investigation in this thesis.

The purpose of this experiment is to study conditionability of female Ss in the simple Taffel design which is most effective for the assessment of awareness. Females were chosen because research has indicated that if they become aware they are more likely than male Ss to act on their awareness (Spielberger, Berger, and Howard, 1963).

It is hypothesized that aware Ss will be distinguished from unaware Ss by less anxiety, higher rating on the digit-span scale, higher ego-strength and greater self-sufficiency. The relationship of anxiety to conditioning is a complex one and the evidence is contradictory. It is assumed here that a less anxious person would be more capable of attending to the environment than a highly anxious person and thus would be more aware of the relationships existing between the E's behavior and his own. Since it is believed that a high score on the WAIS digit-span scale is related to attention and inversely related to anxiety as clinically measured (Wechsler, 1958), a high score on this scale should characterize the aware Ss. Higher ego-strength and greater self-sufficiency are believed to be related to the ability to deal with one's environment and thus are assumed to include cognizance of factors operating within the environment.

Concerning other personality characteristics being tested, it is expected that there will be some, hitherto unexplored, which will differentiate the subgroups according to awareness and attitude. In this sense the present investigation is exploratory.

CHAPTER III

METHOD

To investigate various relationships between aware and unaware Ss in a verbal conditioning situation 120 female Ss were chosen to participate in an experiment based on Taffel's (1955) design. This relatively simple design was chosen in preference to a more complex one because awareness is more readily detected with Taffel's procedure. Six weeks prior to the experiment the Ss took the Nicolay-Walker (1963) Personal Reaction Schedule and Cattell's (1964) 16 PF Questionnaire. Throughout the experiment anonymity was preserved. Each S chose a pseudonym by which she was known to the E. It was hoped that anonymity would insure greater frankness in answering the questions on the personality tests and would create a more relaxed atmosphere during the experiment.

Subjects

The Ss were 120 female novices in a religious community. Their ages ranged from 19 to 26, with a mean age of 20.8. They were randomly assigned to three groups: Experimental (E), 60 Ss; Control I (C-I) - no reinforcement, 30 Ss; Control II (C-II) - predetermined random reinforcement, 30 Ss.

Instruments

The Nicolay-Walker Personal Reaction Schedule (PRS) was chosen to

assess the personality variable of anxiety since the presence or absence of anxiety seems to be a critical factor in awareness and conditionability. The PRS in addition to giving a general anxiety score provides a finer measure of anxiety in the following areas: Motor Tension; Object Anxiety; and Personal Inadequacy. In addition the Taylor (1953) MAS score and the K score of the MMPI (Hathaway and McKinley, 1951) are obtained from the particular form of this instrument which was used.

Cattell's 16 PF Questionnaire was selected to assess personality variables because it is considered a comprehensive measure of distinct personality factors. Since the area of personality variables is the special focus of this experiment, it was believed that this questionnaire would provide the best assessment of relevant aspects of personality.

In order to gather additional information on the phenomenon of awareness, the Digit-Span subtest of the WAIS was administered. Since this test is considered to correlate negatively with anxiety and to be a measure of attention, it was expected that it would be related to the aware-unaware continuum. This subtest was given to each S as part of the experiment. It immediately preceded the verbal conditioning procedure described below.

Procedure

The experimental apparatus consisted of 100 unlined white 3 x 5 cards. One hundred commonly used neutrally-toned verbs were selected, and in the middle of each card was typed a single verb in the past tense. Underneath each verb six pronouns--I, We, You, He, She, They--were typed in

random order.

The S was instructed to say the first sentence which came to mind containing the verb and beginning with any one of the pronouns. The pronoun used was recorded by the E on a special data sheet (Appendix I). The operant rate for the pronouns was established during the first 20 trials, each card constituting a trial, when no reinforcement was given. During the next 80 trials the response of the E varied according to the following groups:

Experimental Group (E): after every sentence beginning with I or We, the E administered the reinforcement "mm hmm" in a neutral but not uninterested tone.

Control Group I (C-I): no reinforcement was administered.

Control Group II (C-II): the reinforcement "mm hmm" was administered after every seventh and twelfth sentence regardless of the pronoun used.

Following the experiment the E interviewed each S according to an intensive post-conditioning interview schedule (Levin, 1961) (Appendix II). Ss in Control Group I were asked questions 1 through 8 only. On the basis of this questionnaire the Ss in the experimental group were judged to be aware (A) or unaware (U) of the correct contingency and to have liked (L) or been indifferent to or not liked (NL) the reinforcement.

CHAPTER IV

RESULTS AND DISCUSSION

Conditioning Data

Edwards Trend Analysis (1954) was used to determine differences between the experimental, control, and various experimental subgroups. For purposes of analysis the trials were divided into 5 blocks of 20 trials each. Table 1 shows the results of this analysis for the experimental and the two control groups; Figure 1 depicts the same data.

Although there was a significant difference over blocks, there was no significant difference among the three conditions. This was not unexpected in view of the fact that the aware-unaware variable was hypothesized as the critical factor in increase of response.

An interesting feature of this data was the decrease in performance during the fourth block for both reinforced groups. The non-reinforced Control I group, on the other hand, except for a barely perceptible decrease on the third block, showed a consistent increase in performance. Evidently the reinforcement, whether random or patterned, exerted an influence on the Ss' behavior.

A Trend Analysis was also computed for the Aware (N=27) and Unaware (N=33) experimental groups, as determined from the post-conditioning interview, and the two control groups. This data is contained in Table 2;

TABLE 1

TREND ANALYSIS FOR VERBAL CONDITIONING DATA FOR EXPERIMENTAL,
CONTROL I, AND CONTROL II GROUPS

Source	SS	df	MS	F
Methods	49.31	2	24.65	1.14
Pooled SS (b) in each method	2517.38	117	21.51	
Blocks	134.82	4	33.70	7.5**
Methods x Blocks	143.86	8	17.98	3.9**
Pooled SS x Blocks interaction	2105.00	468	4.5	
Total	4950.37	599		

**Significant at .01 level

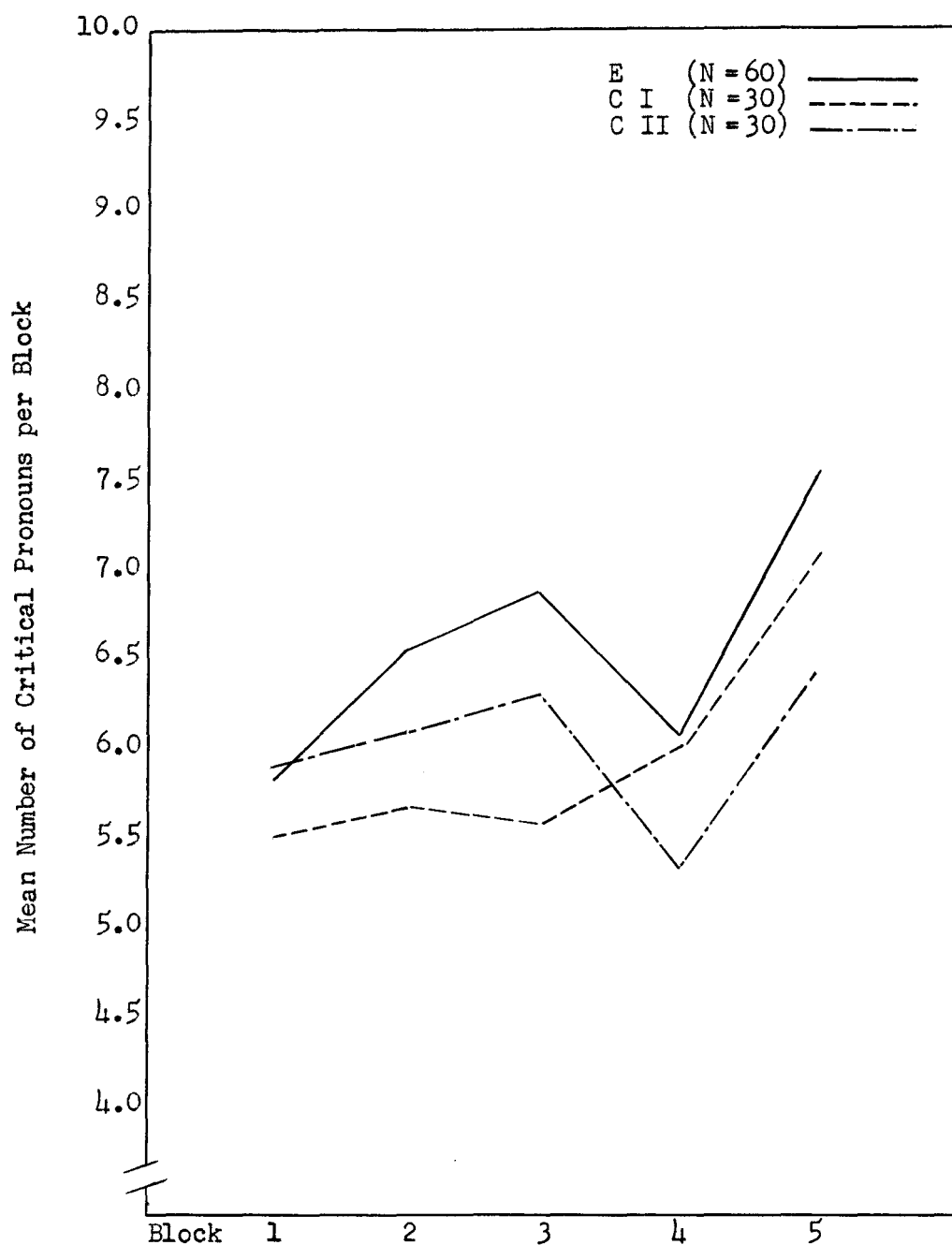


FIGURE 1. TREND OF CRITICAL PRONOUNS PER BLOCK FOR EXPERIMENTAL, CONTROL I AND CONTROL II GROUPS

TABLE 2

TREND ANALYSIS FOR VERBAL CONDITIONING DATA FOR AWARE,
UNAWARE, CONTROL I, CONTROL II GROUPS

Source	SS	df	MS	F
Methods	51.19	3	17.06	.83
Pooled SS (b) in each method	2515.50	116	21.68	
Blocks	134.82	4	33.70	7.5**
Methods x Blocks	17.16	12	1.43	.29
Pooled SS x Blocks interaction	2331.70	464	4.98	
Total	4950.37	599		

**Significant at .01 level

Figure 2 is a graphic representation of this same data.

Contrary to predictions there was no statistical difference between these groups, except in blocks. The unaware group actually had a lower mean average on the fifth block than the non-reinforced control group (C-I). The decrease in performance by the experimental group on the fourth block seems to be accounted for largely by the aware group, which fell below the performance of the unaware and Control I groups and performed equal to the initial operant rate. Some possible reasons will be advanced for this after the analysis of the correlations between personality factors and conditioning data.

An additional breakdown of the aware and unaware groups based on attitude toward the reinforcement yielded the four subgroups mentioned earlier: Aware and liked the reinforcement (A-L); Aware and were indifferent to or did not like the reinforcement (A-NL); Unaware and liked the reinforcement (U-L); and Unaware and were indifferent to or did not like the reinforcement (U-NL). The analysis for these groups is contained in Table 3; Figure 3 depicts the same data graphically. An F-score of 2.78 is needed for significance at the .05 level with 3 and 56 df. The F-score of 2.51 was close enough to the required score to warrant the calculation of t-tests on the data. A significant difference was found between the A-L and A-NL groups for the fourth block (.01 level; t = 2.59), fifth block (.05 level; t = 2.24) and total blocks (.05 level; t = 2.56).

Since it was evident that the factor of attitude was operating on the conditioning scores a final analysis was performed on the data for those Ss in the Experimental group who liked the reinforcement (L) and

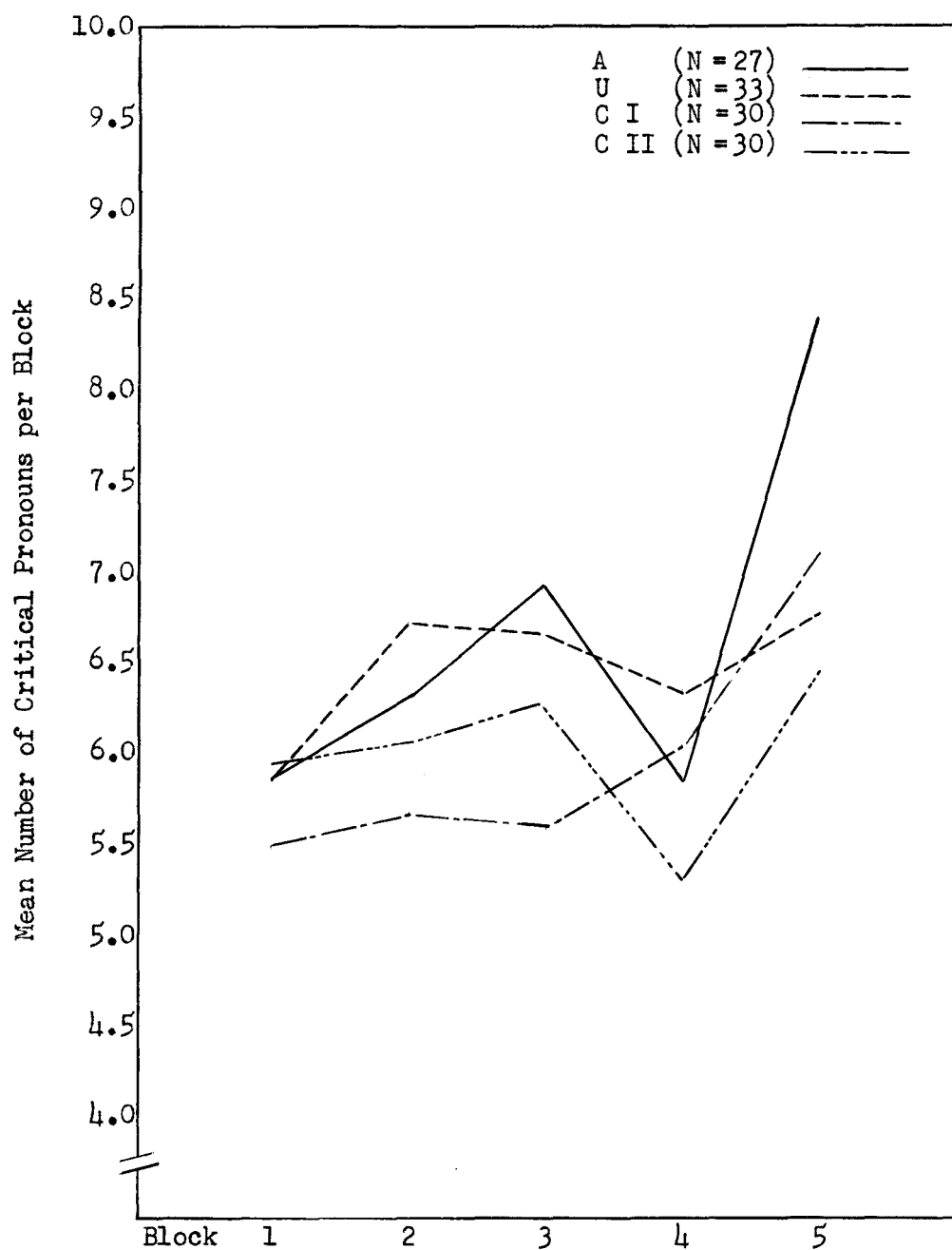


FIGURE 2. TREND OF CRITICAL PRONOUNS PER BLOCK FOR AWARE, UNAWARE, CONTROL I AND CONTROL II GROUPS.

TABLE 3
TREND ANALYSIS FOR VERBAL CONDITIONING DATA
FOR A-L, A-NL, U-L, U-NL GROUPS

Source	SS	df	MS	F
Methods	131.26	3	43.75	2.51
Pooled SS (b) in each method	972.94	56	17.37	
Blocks	98.57	4	24.64	4.90**
Methods x Blocks	60.45	12	5.04	1.00
Pooled SS x Blocks interaction	1121.86	224	5.008	
Total	2384.08	299		

**Significant at .01 level

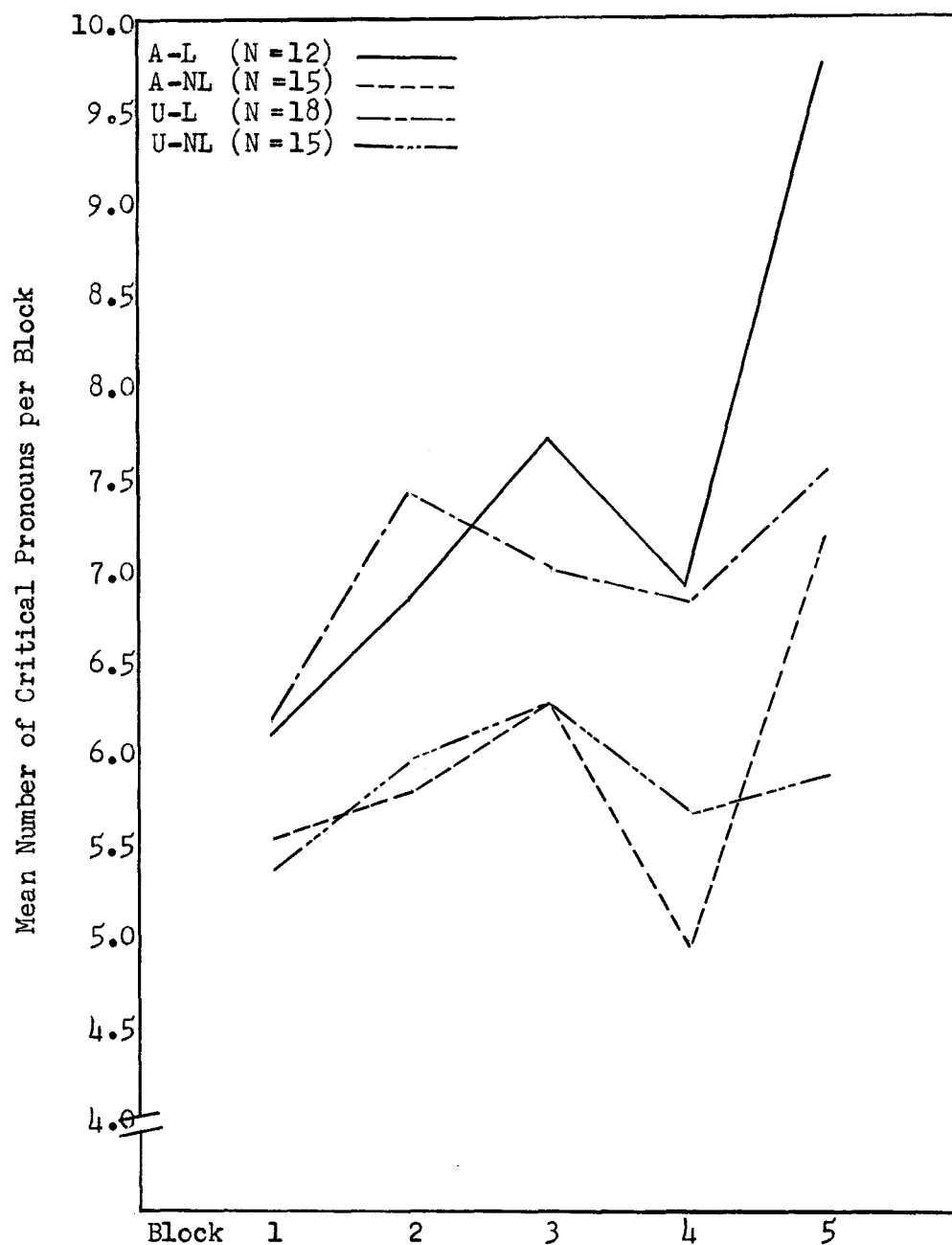


FIGURE 3. TREND OF CRITICAL PRONOUNS PER BLOCK FOR A-L, A-NL, U-L, U-NL GROUPS.

those who were indifferent to or who did not like it (NL). This data is contained in Table 4 and is presented graphically in Figure 4.

As indicated the group which liked the reinforcement (L) and the group which was indifferent to or did not like the reinforcement (NL) were significantly different from each other at the .01 level. The two groups also differed significantly from the two control groups ($F = 2.8$; significant at .05 level).

Personality Test Data

T-tests were computed for all personality characteristics for the following subgroups in the experimental group ($N = 60$): Aware (A)--Unaware (U); Like (L)--Did Not Like (NL); Aware-Like (A-L)--Aware-Did Not Like (A-NL); Unaware-Like (U-L)--Unaware-Did Not Like (U-NL). Pearson Rho correlations were also computed for all variables in the above groups.

Aware-Unaware Groups

On only one personality factor--PF G: Expedient-Conscientious--did the Aware ($N = 27$)-Unaware ($N = 33$) groups differ significantly. The Unaware Group was more conscientious, persevering, rule-bound. (The means and standard deviations for the A and U groups respectively were $M = 15.93$, $SD = 2.21$ and $M = 17.21$, $SD = 2.59$. This difference was significant at the .05 level; $t = 2.02$). But this one difference out of a possible 29 could be accounted for by chance.

The personality characteristics for which predictions of differences were made were remarkably similar. For example, the mean scores in the A-U groups respectively were: Attention 11.82 and 11.55; Anxiety

TABLE 4
TREND ANALYSIS FOR VERBAL CONDITIONING DATA
FOR L AND NL GROUPS

Source	SS	df	MS	F
Methods	126.55	1	126.55	7.5**
Pooled SS (b) in each method	977.65	58	16.86	
Blocks	98.57	4	24.64	4.87**
Methods x Blocks	8.55	4	2.14	.42
Pooled SS x Blocks interaction	1173.76	232	5.06	
Total	2385.08	299		

**Significant at .01 level

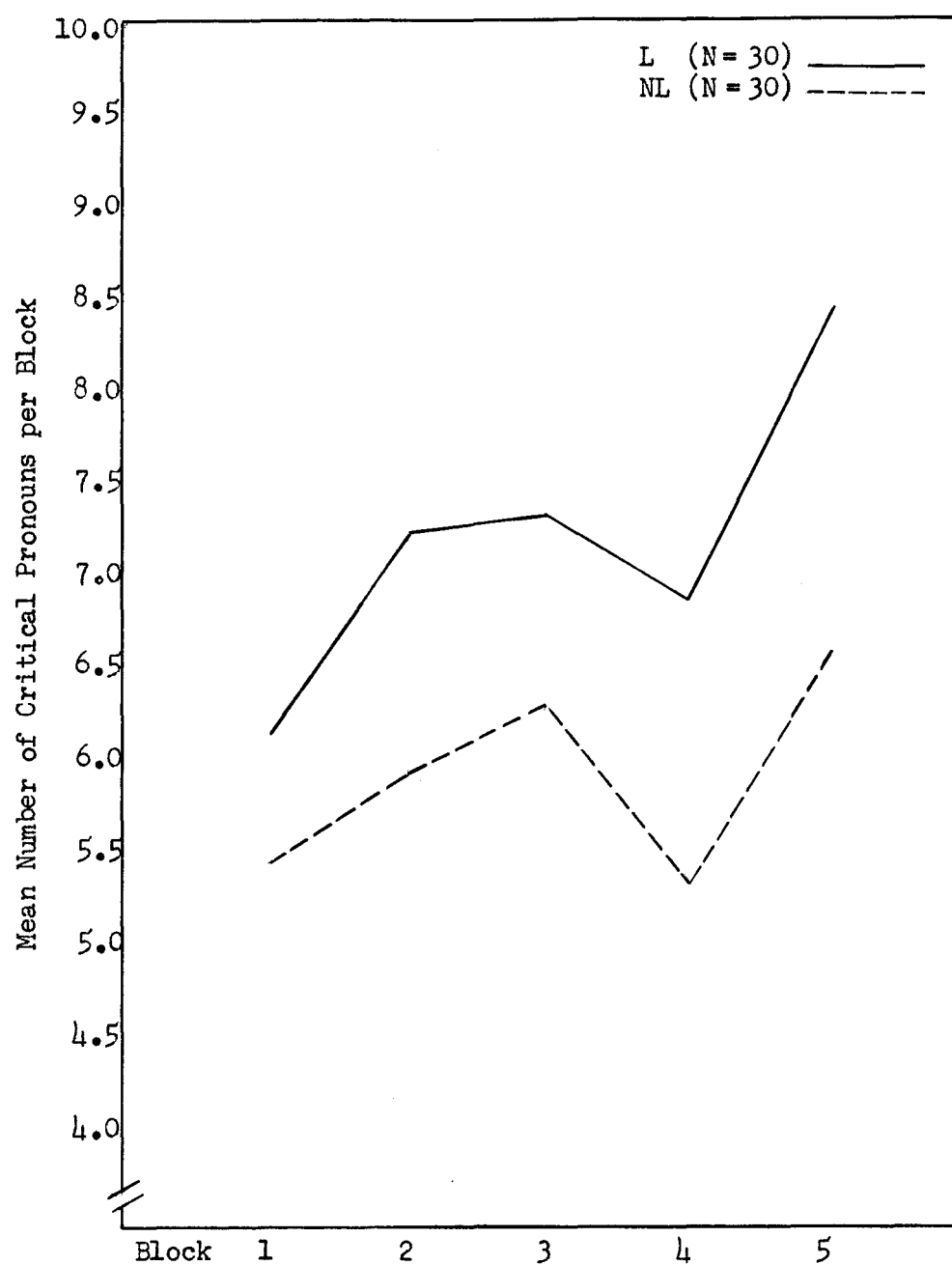


FIGURE 4. TREND OF CRITICAL PRONOUNS PER BLOCK FOR L AND NL GROUPS.

(PRS) 25.33 and 25.49; MAS 13.93 and 12.88; Higher Ego-Strength 16.70 and 16.18 and Self-Sufficiency 10.26 and 9.76.

With respect to the personality characteristic in which the A-U groups differed significantly--Personality Factor G--there were significant differences between the intercorrelations. (See Tables 5 and 6 for the matrices of intercorrelations.) Factor G--Conscientiousness--correlated positively with anxiety in the Aware group and negatively with anxiety and self-sufficiency in the Unaware group.

The complex relationship between this factor and several other characteristics of the subjects will be discussed when the other analyses have been presented.

The variable of Attention was positively correlated with PF-Q4 (Tense, overwrought) $r = .42$, $p < .05$; Personal Inadequacy (PRS-P) $r = .64$, $p < .01$; PRS Total, $r = .50$, $p < .01$; and MAS, $r = .48$, $p < .05$ for the Aware group. The last three r 's were significantly different at the .05 level from the Unaware group. The correlations with attention in the Unaware group were Personal Inadequacy, $r = .08$, PRS Total, $r = -.03$, and MAS, $r = -.03$.

Groups which Liked and Did Not Like the Reinforcement

Considering these same sixty subjects according to their attitude toward the reinforcement, however, gave evidence of significant personality differences as well as the significant differences in conditioning discussed earlier.

Of the 23 personality variables tested, these groups differed

TABLE 5. INTERCORRELATIONS FOR ALL VARIAB

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q1	Q2	Q3
A		-.24	.02	.06	.64b!	-.41*	.47*	-.25	-.13	.07	.19	-.06	-.24	-.56a!				-.05
B			-.20	.15	-.40a*	.19	-.21	.14	.06	.25	-.09	.00	.23	.21				.20
C				.00	.10	.22	.47*	.08	-.55!	-.28	-.18	-.74!	-.29	.07a				.44*
E					.18	.14	.32	-.14	.15	.41*	.02	.01	.00	.00				-.01
F						-.53!	.39*	-.39a	.25	.05	-.01	-.01	-.28	-.39*				-.26
G							-.19	.33	-.06	-.35	.19	-.07	.10	.35a				.46*
H								.03	-.25	.04	.10	-.52!	-.03	-.34				.12
I									.10	.06	.43*	.15	.03	.26				.04
L										.09	.26b	.63!	-.04	.05				-.38*
M												-.20	.22	.09	.20			-.57!
N													.24a	.07	-.06			.15
O														.00	.06a			-.59!
Q1																	.12	.16
Q2																		-.21
Q3																		
Q4																		
PRS-M																		
PRS-O																		
PRS-P																		
PRS-To.																		
K																		
MAS																		
ATTN																		
Bl 1																		
Bl 2																		
Bl 3																		
Bl 4																		
Bl 5																		
Bl To.																		

Bl 1

a

Difference between r's (for A-U groups) significant at .05 level

Bl 2

b

Difference between r's (for A-U groups) significant at .01 level

Bl 3

*

r significantly different from zero at .05 level

Bl 4

!

r significantly different from zero at .01 level

Bl 5

Bl To.

a Difference between r's (for A-U groups) significant at .05 level

b Difference between r's (for A-U groups) significant at .01 level

* r significantly different from zero at .05 level

! r significantly different from zero at .01 level

¹For the benefit of those who are not completely familiar with the operational definitions of the various scales used (Cattell 16 PF Questionnaire, Nicolay-Walker Personal Reaction Schedule, WAIS Attention measure), a definition of each value is given in Appendix

VARIABLES FOR AWARE GROUP (N = 27)¹

[illegible]

TABLE 6. INTERCORRELATIONS FOR ALL VAI

	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3
A		.22	-.01	-.02	.04a	-.01	-.01	.13	-.15	-.04	.05	-.01	.04	-.01a	-.2
B			.01	.33	.15a	.00	.08	-.02	.00	.37*	.13	.15	.08	.13	-.1
C				-.05	-.03	.23	.38*	-.04	-.24	-.31	.22	-.65!	.02	-.49a!	.4
E					.36*	-.12	.49!	.21	-.21	.11	.14	-.05	.13	.31	.1
F						.13	.38*	.24a	-.11	.15	.00	-.17	-.15	-.10	-.0
G							.30	.10	-.38*	-.10	.45!	-.29	-.12	-.33a	.1
H								.01	-.48!	-.19	.44*	-.65!	.00	-.39*	.2
I									-.20	.40*	.10	.01	.02	.01	-.3
L										.05	-.41a*	.52!	-.35*	.20	-.0
M											-.01	.41*	.10	.32	-.2
N												-.40a*	-.04	-.03	.1
O													.06	.53a!	-.3
Q1														.23	.2
Q2															.0
Q3															
Q4															
PRS-M															
PRS-O															
PRS-P															
PRS-To.															
K															
MAS															
ATTN															
Bl 1															
Bl 2															
Bl 3															
Bl 4															
Bl 5															
Bl To.															

a Difference between r's (for A-U groups) significant at .05 level
 b Difference between r's (for A-U groups) significant at .01 level
 * r significantly different from zero at .05 level
 ! r significantly different from zero at .01 level

on 13. T-test analyses of this data are contained in Table 7. Drawing upon the characteristics differentiating the two groups, the description contained in Table 8 was formulated. Where the differences fall within the average range as designated by Cattell's Sten system, or the Nicolay-Walker norms, this has been noted in order to indicate which scores actually deviate from average norms as well as which scores differ from each other in these two groups.

In the analysis of the intercorrelations among all variables, the most striking differences occur in the correlations between various anxiety measures and the blocks of trials. For the Ss who liked the reinforcement, and who obtained average scores on the anxiety measures, these scores correlated negatively with trial scores. Of a possible 42 correlations, 15 are significantly different from zero at the .05 level and 4 at the .01 level. For the Ss who did not like the reinforcement, and whose anxiety scores are below average, the correlations between these scores and trial scores are consistently positive but low and not significant. Eighteen of the 42 correlations are significantly different from each other in the two groups: 12 at the .05 level and 6 at the .01 level. (These scores are contained in the intercorrelation matrices, Tables 9 and 10.)

A comparison of these correlations with the Aware-Unaware groups shows that the correlations for the Unaware Group are consistently negative, although low and not significant. Except for the failure to achieve significance, this tendency is similar to the L Group. The trend in the Aware group is similar to the NL group, except for an interesting

TABLE 7

DIFFERENCES BETWEEN GROUPS ACCORDING
TO ATTITUDE TOWARD REINFORCEMENT (L AND NL GROUPS)

Variable	L		NL		T-score
	Mean	SD	Mean	SD	
PF-A	10.43	3.63	10.30	3.61	.14
PF-B	9.67	1.52	9.53	1.34	.38
PF-C	15.30	3.90	17.53	3.85	2.19*
PF-E	7.73	3.69	9.63	3.61	1.98*
PF-F	13.17	5.41	12.43	4.76	.52
PF-G	16.23	2.49	17.03	2.45	1.23
PF-H	10.63	5.26	13.87	5.45	2.31*
PF-I	13.73	2.37	13.47	2.43	.42
PF-L	7.47	2.87	5.80	2.60	2.35*
PF-M	13.00	3.67	11.43	2.97	1.80
PF-N	8.07	2.41	9.03	2.22	1.57
PF-O	14.57	4.98	10.47	4.64	3.25**
PF-Q ₁	8.60	2.49	9.27	2.56	1.01
PF-Q ₂	10.40	2.37	9.57	3.41	1.08
PF-Q ₃	10.17	3.16	12.10	2.52	2.57*
PF-Q ₄	14.30	3.51	12.27	3.78	2.14*
PRS-M	11.30	4.29	8.00	3.12	3.33**
PRS-O	7.60	3.19	5.30	3.15	2.74**
PRS-P	11.60	5.04	7.30	3.48	3.77***
PRS-Total	30.23	10.28	20.60	7.33	4.10***
K	16.63	4.56	18.93	4.01	2.04*
MAS	16.97	8.94	9.73	5.67	3.69***
ATTN.	11.80	2.22	11.53	2.17	.47
Block 1	6.20	1.52	5.50	1.67	1.67
Block 2	7.23	2.53	5.93	2.39	2.03*
Block 3	7.33	2.48	6.33	2.67	1.47
Block 4	6.90	3.33	5.37	2.19	2.07*
Block 5	8.40	4.60	6.57	2.57	1.87
Total Bl.	36.10	11.69	29.70	8.52	2.39*

Significance:

* .05 level

** .01 level

*** .001 level

TABLE 8

DIFFERENCES BETWEEN L AND NL SUBJECTS ON PERSONALITY TRAITS

Description of Subjects				
Factor	<u>Ss</u> : liked reinforcement	<u>Ss</u> : did not like reinforce.	T	Signif.
PF-C	Av: emotional maturity	Ab.av: emot. maturity	2.19	.05
PF-E	Av: conforming-independent	Ab.av: independent assertive	1.98	.05
PF-H	Av: shy-bold	Within av: range but more venturesome	2.31	.05
PF-L	Av: adaptable-opinionated	Adaptable-trusting	2.35	.05
PF-O	Worrying, apprehensive	Placid, self-assured	3.25	.01
PF-Q ₃	Av: careless of protocol-self-disciplined	Within av. range but more socially precise	2.57	.05
PF-Q ₄	Av: relaxed-tense	Relaxed	2.14	.05
PRS-M	Av: motor tension	Less tension	3.33	.01
PRS-O	Av: object tension	Less tension	2.74	.01
PRS-P	Av: personal inadequacy	Less feeling of personal inadequacy	3.77	.001
PRS-Tot.	Av: anxiety	Less anxiety	4.10	.001
MAS	Av: anxiety	Less anxiety	3.69	.001
K(MMPI)	Av: defensiveness	Ab.av: defensiveness	2.04	.05

TABLE 9. INTERCORRELATIONS FOR ALL

	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3
A															
B	-.34														
C	.22	-.16													
E	-.05	.28	-.17												
F	.32	.12	.22												
G	-.24	.13	.22	.37*											
H	.33	-.18	.42*	-.27a	.14a										
I	.07	.04	-.07	.08	.29a	.13									
L	-.29	.12	-.22	.29a	.13	-.21									
M	-.08	.31	-.25	.13	-.21	.24									
N	.10	-.16	.11	-.21	.24	-.18									
O	-.16	.12	-.63!	.24	-.18	.30									
Q1	-.12	.04	-.44a*	-.18	.30	-.40*									
Q2	-.22	.09	-.62b!	.30	-.15	-.49!									
Q3	-.02	-.19	.52!	-.15	-.11	.11									
Q4															
PRS-M															
PRS-O															
PRS-P															
PRS-To.															
K															
MAS															
ATTN															
B1 1															
B1 2															
B1 3															
B1 4															
B1 5															
B1 To.															

a Difference between r's (for L-NL groups) significant at .05 level

b Difference between r's (for L-NL groups) significant at .01 level

* r significantly different from zero at .05 level

! r significantly different from zero at .01 level

VARIABLES FOR L GROUP (N = 30)

[illegible]

TABLE 10. INTERCORRELATIONS FOR ALL

	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2
A		-.11	-.18	.01	.24	-.20	.04	-.20	.04	.03	.18	.12	-.01	-.29
B			.02	.29	-.32	.04	.18	.06	-.14	.37*	.30	.02	.24	.20
C				-.07	-.15	.10	.29	.13	-.43*	-.25	-.18	-.66!	.11a	.15a
E					.30	.26a	.63a!	.13	-.34a	.56!	.27	-.11	.24	.12
F						.07	.29	.00	.06	.13	.09	.04	.00	-.39*
G							.19	.22	-.37*	.21a	.29	-.14	.05	.30
H								.32a	-.35	.33a	.18	-.45*	.22a	-.23
I									-.28	.41*	.19	-.15	.06	.13
L										-.28	-.04	.56!	-.30	-.08
M											.24a	.16	.10	.25
N												.20	.14	.19
O													-.09	.07a
Q1														.06
Q2														
Q3														
Q4														
PRS-M														
PRS-O														
PRS-P														
PRS-To.														
K														
MAS														
ATTN														
B1 1														
B1 2														
B1 3														
B1 4														
B1 5														
B1 To.														

a Difference between r's (for L-NL groups) significant at .05 level
 b Difference between r's (for L-NL groups) significant at .01 level
 * r significantly different from zero at .05 level
 ! r significantly different from zero at .01 level

VARIABLES FOR NL GROUP (N = 30)

[illegible]

and consistent difference; the correlations between Anxiety and Block 2 are negative rather than positive for the Aware group.

Aware-Like and Aware-Did Not Like Groups

Analysis of the data according to attitude and awareness-unawareness was undertaken in an attempt to clarify the differences already noted in the above discussions.

In the A-L and A-NL groups the only significant differences were in the Anxiety scores: PRS--Motor Tension, Personal Inadequacy, and Total PRS. The scores of the A-NL group were significantly lower than the A-L group, whose scores fell within the average range according to previous studies with this instrument. This would be expected since the Aware-Unaware groups did not differ from each other whereas the L and NL groups showed significant differences in this area; the NL group registered scores lower than average.

It is, however, in the analysis of the intercorrelations (Tables 11 and 12) with all other variables that differences are manifested. These appeared in Factor A--outgoing, sociable--a factor which did not differentiate either the A-U or L-NL groups when analyzed separately. In Factor A eleven of the 28 intercorrelations were significantly different for the A-L and A-NL groups. Factor A scores for the subjects who liked the reinforcement (A-L) were negatively correlated with PF-B, Intelligence; PF-L, Being Opinionated; PF-O, Apprehension; PRS Motor Tension; PRS Personal Inadequacy; PRS Total; MAS; Block 1 and Total Blocks, and positively correlated with PF-C, Emotional Maturity, and K (MMPI).

TABLE 11. INTERCORRELATIONS FOR ALL

	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3
A		-.64a*	.70b*	-.16	.72!	-.50	.77!	-.25	-.59a*	-.08	-.08	-.60a*	-.43	-.55	.12
B			-.28	.32	-.33	.22	-.56	-.20	.22	.09	-.35	.18	.14	.45	.18
C				-.02	.45	.06	.69*	.08	-.44	-.37	.04	-.74!	-.46	-.68b*	.60*
E					.28	-.04	.14	.00	.51	.42	-.05	.12	-.45a	-.09	-.13
F						-.65*	.62*	-.25	-.03	.30	-.30	-.41	-.43	-.27	-.14
G							-.25	.65*	.23	-.62*	.43	.20	.06	.00	.42
H								-.02	-.25	-.16	.16	-.64*	-.43	-.86b!	.28
I									.23	-.25	.52	.25	.21	-.13	.13
L										.30	.01	.47	-.08	.28	-.35
M											-.54	.41	.01	.29	-.75!
N												-.10	.14	-.33	.42
O													.14	.60a	-.74!
Q1														.44	-.01
Q2															-.48
Q3															
Q4															
PRS-M															
PRS-O															
PRS-P															
PRS-To.															
K															
MAS															
ATTN															
B1 1															
B1 2															
B1 3															
B1 4															
B1 5															
B1 To.															

a Difference between r's (for A-L and A-NL groups) significant at .05 level
 b Difference between r's (for A-L and A-NL groups) significant at .01 level
 * r significantly different from zero at .05 level
 ! r significantly different from zero at .01 level

R ALL VARIABLES FOR A-L GROUP (N = 12)

[illegible]

TABLE 12. INTERCORRELATIONS FOR ALL

	A	B	C	E	F	G	H	I	J	K	N	O	Q1	Q2
A		.10a	-.50a	.39	.54*	-.31	.22	-.34	.20a	.21	.43	.37a	-.01	-.61*
B			-.16	-.05	-.45	.14	.10	.41	-.08	.44	.20	-.16	.32	.13
C				-.07	-.17	.39	.28	.14	-.66!	-.16	-.39	-.74!	-.22	.42a
E					.23	.31	.54*	-.18	-.17	.45	.15	-.05	.37a	.03
F						-.36	.16	-.62*	.48	-.26	.26	.35	-.04	-.49
G							-.12	.14	-.39	.00	-.12	-.37	.11	.59*
H								.04	-.30	.24	.02	-.43	.37	-.15b
I									-.08	.28	.36	.05	-.02	.41
L										-.20	.57*	.81!	.14	-.23
M											.19	.00	.21	.19
N												.62*	.03	.06
O													-.10	-.18
Q1														-.01
Q2														
Q3														
Q4														
PRS-M														
PRS-O														
PRS-P														
PRS-To.														
K														
MAS														
ATTN														
B1 1														
B1 2														
B1 3														
B1 4														
B1 5														
B1 To.														

a Difference between r's (for A-L and A-NL groups) significant at .05 level
 b Difference between r's (for A-L and A-NL groups) significant at .01 level
 * r significantly different from zero at .05 level
 ! r significantly different from zero at .01 level

VARIABLES FOR A-NL GROUP (N = 15)

[illegible]

These positive and negative correlations were reversed for the A-NL group. The correlations differed significantly for the two groups at the .05 level except for the following which differed at the .01 level: Factor C, PRS Personal Inadequacy and K.

Regarding the factor of Attention which differentiated between the Aware-Unaware groups, it also differentiated the A-L and A-NL groups in the same way. Attention correlated positively with Anxiety in the group which liked the reinforcement and negatively with the K Factor: Q4 ($\underline{r} = .76, p < .01$); PRS-Object Anxiety ($\underline{r} = .68, p < .05$); PRS-Personal Inadequacy ($\underline{r} = .82, p < .01$); PRS-Total ($\underline{r} = .68, p < .05$); MAS ($\underline{r} = .60, p < .05$); K ($\underline{r} = -.78, p < .01$). These were all significantly different from the corresponding intercorrelations for A-NL group which were very low. These groups differed from each other on the anxiety variables at the .05 level and on the K factor at the .01 level.

The large correlations between the anxiety-attention measures for the A-L group require further elaboration. A comparison of the corresponding intercorrelations for all subjects, including controls, indicated that generally there was a small positive correlation between anxiety and attention. The fact that the A-L subgroup had the highest mean Attention score ($M = 12.50$) although it was not significantly different from the A-NL group ($M = 11.27$; $t = 1.29, n.s.$) was also a factor to be considered. Examination of the interview profiles for these two groups indicated that the reason given by the A-NL group for disliking the reinforcement was that use of the first person pronoun made them uncomfortable and self-conscious because they did not know what conforming would indicate about

their personalities.

The fact that these Ss had very low anxiety scores on all measures opens up the question of accounting for their uneasiness in the experimental situation. This same group also had scores indicating that they were more emotionally mature and more serious than the A-L group. While the A-L group had average scores on the emotional maturity factor (PF-C) and the sober-gay factor (PF-F), it was above average on Factor A-- outgoing, sociable. This difference was especially striking in view of the fact that the entire group of 120 Ss was below average on this factor.

Regarding the Anxiety scores and their correlations with Blocks of Trials, in general a negative correlation existed between Blocks and all Anxiety measures for the group which liked the reinforcement. This was a resolution of opposing tendencies mentioned above where the correlations for the A group were generally positive and for the L group consistently negative. The subgroup A-L followed the tendency which appeared in the L group.

For the A-NL group, positive correlations existed, comparable to the NL group discussed above.

Thirteen of the possible 42 intercorrelations among the anxiety measures (PF-O, PF-Q4, PRS-M, PRS-O, PRS-P, PRS-Total, MAS) were significantly different from each other for these two groups: 11 at the .05 level and 2 at the .01 level.

Another interesting feature of the Anxiety and K scores for these groups was that for the A-L group all but one of the intercorrelations of the Anxiety measures were significantly different from zero whereas for

the A-NL group only 15 of the 28 intercorrelations were significant. This seems noteworthy because in the A-U and L-NL groups intercorrelations were significant for each of the four groups. The fact that the subgroup A-NL should show such marked inconsistency in its intercorrelations was a further indication of the complex relationship of anxiety to other factors in the experimental situation.

Besides the anxiety scores the factor which distinguished the two groups most consistently in its correlation with Blocks was Factor M--Conventional (low score) vs. Imaginative (high score). This factor correlated positively with blocks in the A-NL group and negatively in the A-L group. These were significant for Blocks 1 ($p < .01$), 4 ($p < .05$) and 5 ($p < .01$) and Total ($p < .01$). It would seem that for the group which liked the reinforcement, conventionality was related to emitting the correct response. For the group which did not like the reinforcement, however, scores depicting imaginative tendencies were related to increase of the response.

Unaware-Like and Unaware-Did Not Like Groups

It is, however, in the analysis of the data for the Unaware Group according to attitude that greater differences appear. It will be remembered that the A-L and A-NL groups differed only on the anxiety variable, the latter being less anxious. Also in the analysis of the entire experimental group according to attitude--L and NL Groups--significant differences were observed in 13 of the 23 variables. The present groups, U-L and U-NL, differed significantly on 12 of the 23

variables, eleven of which were the same as the L and NL groups. But there are several differences which are worth noting. (Table 13 contains the t-test data for these groups and Table 14 is a descriptive formulation of the differences.)

There are two variables which differentiated the L-NL groups which, however, were not significantly different in these groups when the Ss were unaware of the correct contingency. The failure to find a significant difference in Personality Factor E--conforming vs. independent--was that both groups, U-L and U-NL achieved higher scores, toward the independent end of the scale. This was the tendency which was evident in the L and NL groups.

For Personality Factor L--adaptable vs. opinionated--the mean scores for the U-L and U-NL groups are similar to the L and NL groups. A t score of 1.94 just failed to reach significance and in view of the smaller N in these groups it may be conjectured that a difference could exist on this characteristic.

One additional variable which did not appear to differentiate the L and NL groups was significant at the .01 level for the U-L and U-NL groups. On Personality Factor N--forthright, "artless, natural" vs. shrewd, calculating, penetrating--each group moved toward the end of the scale according to the tendency indicated for the N and NL groups in Table 7, page 31. The U-L group was revealed to be more forthright and "artless" and the U-NL group more shrewd and penetrating, although the latter's mean score was still within the average range of Cattell's norms. The low score of the U-L group on this factor accounts for the difference.

TABLE 13

DIFFERENCES BETWEEN UNAWARE GROUPS ACCORDING
TO ATTITUDE TOWARD REINFORCEMENT (U-L AND U-NL GROUPS)

Variable	U-L		U-NL		T-score
	Mean	SD	Mean	SD	
PF-A	9.33	3.38	10.27	3.77	.72
PF-B	9.83	1.67	9.47	1.45	.64
PF-C	14.89	3.36	17.73	3.83	2.17*
PF-E	8.22	3.54	10.67	3.83	1.84
PF-F	13.06	5.40	14.33	3.93	.76
PF-G	16.61	2.45	17.93	2.63	1.43
PF-H	9.72	5.09	16.27	4.85	3.64***
PF-I	13.72	2.61	14.00	2.17	.32
PF-L	7.33	2.79	5.33	2.93	1.94
PF-M	13.78	3.90	11.33	3.41	1.87
PF-N	7.44	1.99	9.53	2.21	2.75**
PF-O	15.28	4.76	8.60	4.04	4.20***
PF-Q ₁	8.61	2.56	8.93	2.87	.33
PF-Q ₂	10.56	2.65	8.80	2.68	1.81
PF-Q ₃	9.89	3.03	12.27	3.27	2.09*
PF-Q ₄	14.28	2.61	11.80	3.87	2.05*
PRS-M	11.22	4.22	7.93	3.64	2.33*
PRS-O	7.78	3.41	4.13	2.43	3.48**
PRS-P	11.67	5.03	7.20	3.90	2.79**
PRS-Total	30.67	10.15	19.27	7.99	3.50***
K	16.39	4.85	20.20	3.13	2.63**
MAS	17.33	9.04	7.53	4.63	3.89***
ATTN	11.33	1.92	11.80	2.25	.62
Block 1	6.22	1.48	5.40	1.67	1.44
Block 2	7.45	2.72	6.00	2.83	1.44
Block 3	7.06	2.86	6.33	2.60	.74
Block 4	6.89	4.07	5.73	2.59	.96
Block 5	7.56	5.17	5.93	3.06	1.09
Total Bl.	35.17	13.87	29.40	10.33	1.33

Significance:

* .05 level

** .01 level

*** .001 level

TABLE 14

DIFFERENCES BETWEEN U-L AND U-NL SUBJECTS ON PERSONALITY TRAITS

Description of Subjects			
Factor	<u>Ss</u> : U and liked reinforce.	<u>Ss</u> : U and did not like reinforce.	T
PF-C	Av: emotional maturity	Ab.Av: emotional maturity	2.17*
PF-H	Below av: shy, restrained	Ab.Av: venturesome, socially bold	3.64***
PF-N	Av: forthright, "natural"	Av: shrewd, penetrating	2.75**
PF-O	Ab. av: apprehensive, worrying	Below av: placid, self-assured	4.20***
PF-Q ₃	Av: casual, controlled	Ab.Av: more controlled, socially precise	2.09*
PF-Q ₄	Av: tense, fretful	Relaxed, tranquil	2.05*
PRS-M	Av: motor tension	Less tension	2.33*
PRS-O	Av: object tension	Less tension	3.48**
PRS-P	Av: personal inadequacy	Less feeling of personal inadequacy	2.79**
PRS-Tot.	Av: anxiety	Less anxiety	3.50***
MAS	Av: anxiety	Less anxiety	3.89***
K (MMPI)	Av: defensiveness	Ab.Av: defensiveness	2.63**

Significance:

* .05 level

** .01 level

*** .001 level

Another important difference was revealed by further study of Personality Factor-H--shy vs. bold--which differentiated the L and NL groups at the .05 level. This factor differentiated the U-L and U-NL groups at the .001 level. The U-L group was below average on this factor, that is, more shy and the U-NL group, above average, that is, more bold and venturesome. Unawareness seemed to be the crucial factor in this difference. When the subjects were aware (A-L and A-NL groups) no differences appeared in this factor (Mean (A-L) = 12.00; Mean (A-NL) = 11.47; $t = .25$ n.s.). With attitude held constant, NL-A and NL-U, a significant difference was also revealed (Mean (NL-A) = 11.47 and Mean (NL-U) = 16.27; $t = 2.57$, $p < .05$).

The analysis of the intercorrelation data (Tables 15 and 16) revealed significant interactions between PF-G and other variables, a tendency noted earlier in the discussion of the A-U groups. The trend evident there was more explicit when the unaware group was analyzed according to attitude. In the U-L Group, Factor G--expedient vs. conscientious--correlated negatively with PF-O ($r = -.55$), PF-Q2 ($r = -.78$), PRS-O ($r = -.71$) and PRS-Total ($r = -.61$); these were significant at the .01 level. In the U-NL group, PF-G correlated positively with PF-O ($r = .34$), Q2 ($r = .29$) and PRS-Total ($r = .06$), and negatively with PRS-O ($r = -.03$). These r 's were significantly different from each other for the two groups.

TABLE 15. INTERCORRELATIONS FOR ALL

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q1	Q2
A		-.14	-.28	.15	.07	.05	-.08	.25	-.15	.09	.02	.27	.07	-.03			
B			-.04	.24	.37	.04	.07	.15	.08	.37	.04	.06	.00	-.05			
C				-.28	.00	.45	.14	-.19	-.01	-.13	.11	-.51*	-.44a	-.60!			
D					.45	-.52*	.22	.13	.15	-.10a	-.28	.30	.00	.50*			
E						.09	.54*	.02a	.00	.02	.11	-.23	-.38	-.07			
F							.24	.03	-.34	-.32	.30	-.55a*	-.38	-.78b!			
G								-.38a	-.43	-.37a	.35	-.66!	-.32	-.37			
H									-.04	.36	.24	.22	-.11	.19			
I										.14	-.18	.49*	-.09	.21			
J											.05	.26	.21	.16			
K												-.31	-.45a	-.26a			
L													.39	.60!			
M														.45			
N																	
O																	
Q1																	
Q2																	
Q3																	
Q4																	
PRS-M																	
PRS-O																	
PRS-P																	
PRS-To.																	
K																	
MAS																	
ATTN																	
Bl 1																	
Bl 2																	
Bl 3																	
Bl 4																	
Bl 5																	
Bl To.																	

a Difference between r's (for U-L and U-NL groups) significant at .05 level

b Difference between r's (for U-L and U-NL groups) significant at .01 level

* r significantly different from zero at .05 level

! r significantly different from zero at .01 level

a Difference between r's (for U-L and U-NL groups) significant at .05 level

b Difference between r's (for U-L and U-NL groups) significant at .01 level

* r significantly different from zero at .05 level

! r significantly different from zero at .01 level

TABLE 16. INTERCORRELATIONS FOR ALL

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q1	Q2
A																	
B	-.27																
C	.15	.18															
D	-.28	.59*	-.12														
E	-.05	-.21	-.22	.19													
F	-.13	.02	-.14	.08	.14												
G	-.12	.34	.32	.61*	.08	.14											
H	-.03	-.27	.09	.32	.68a!	.18	.14										
I	-.07	-.20	-.25	-.38	-.17	-.29	.52a*										
J	-.09	.33	-.32	.69a!	.56*	.38	.51a*	-.30									
K	-.04	.45	.02	.27	-.33	.49	.15	.58*	-.42								
L	-.14	.15	-.66!	.06	.27	.34a	-.10	-.34	-.43								
M	.00	.19	.40a	.24	.17	.11	.27	.32	.30	-.20							
N	.19	.31	.22	.42	.17	.11	.21	.32	.31	.23	-.60*						
O	.11	.19	-.22	.42	.17	.11	.21	.32	.31	.23	-.60*	-.03					
Q1																	
Q2																	
Q3																	
Q4																	
PRS-M																	
PRS-O																	
PRS-P																	
PRS-To.																	
K																	
MAS																	
ATTN																	
B1 1																	
B1 2																	
B1 3																	
B1 4																	
B1 5																	
B1 To.																	

- a Difference between r's (for U-L and U-NL groups) significant at .05 level
b Difference between r's (for U-L and U-NL groups) significant at .01 level
* r significantly different from zero at .05 level
! r significantly different from zero at .01 level

FOR ALL VARIABLES FOR U-NL GROUP (N = 15)

CHAPTER V

CONCLUSIONS

Conditioning Data

In accordance with expectations there was no significant difference in conditioning scores among the experimental group, taken as a whole, and the two control groups. There are too many factors recognized in the experimental situation, some of which were discussed in the Introduction and the Review of the Literature, to allow the experimenter to predict a difference based solely on patterned reinforcement. Early experimenters who found differences often did so by eliminating aware Ss or by preselecting Ss according to some differentiating characteristic such as anxiety. More will be said about this later.

Regarding the control groups, an earlier study (Babladelis, 1961) had discovered use of random reinforcement to be a better control than no reinforcement. With no reinforcement Ss showed a gradual decrease in the critical response. In the present experiment this did not occur. The randomly-reinforced control group showed the same general trend as the experimental groups--a decline in response on the fourth block; whereas the non-reinforced control group continued to show an increase.

The explanation for this may be that reinforcement of any kind tended to make the Ss used in this experiment self-conscious. These Ss are

at a point in their religious formation where they are encouraged to avoid self-reference in their conversation as much as possible. The Ss in the randomly-reinforced control group may have avoided using the first person pronoun simply because the reinforcement drew attention to them even though the first person pronouns were not specifically reinforced. In the non-reinforced group no attention was directed to the use of the pronouns.

Contrary to predictions the variable of awareness did not yield significant differences in conditioning behavior for Ss who were aware ($N = 27$) and Ss who were unaware ($N = 33$) according to the interview schedule. Being aware of the correct contingency alone is no guarantee that the S will act on this information. Some Ss revealed during the interview that they "tested" the experimenter to determine whether or not they had correctly interpreted the response contingency and having satisfied themselves that they had, they returned to what they considered a random use of all the pronouns. They saw no reason to emit the "correct" pronoun primarily because they did not know what such conformity would reveal about themselves. For some of the Ss use of "I" and "We" was suggestive of egocentricity and they decided to avoid overusing these pronouns.

In spite of this decision by the aware Ss, however, attitude was an influential factor in their behavior. If they liked the reinforcement and found it pleasant, they increased the use of the critical response. This was borne out by the significant results in conditioning between the A-L and A-NL groups.

It was rather surprising, however, to find significant results in conditioning data solely on the basis of attitude--L and NL groups. Even

though the Ss were unaware of the correct contingency they increased the number of "I" and "We" pronouns if they found the reinforcement pleasant. This was the unmistakable trend in the U-L and U-NL groups even though the results did not reach statistical significance. Perhaps if Ss liked the reinforcement and felt more at ease in the experimental situation because of this, they may have turned more readily to a use of first person statements. This, therefore, could be an artifact of the experimental situation, i.e. use of "I" and "We" evoking this personal response, were it not for the fact that the aware Ss who decided not to use the critical pronouns, in spite of this decision, increased their responses if they liked the reinforcement. It is, therefore, possible to suggest that a positive attitude toward reinforcement in an experimental situation such as this is influential in conditioning.

Personality Characteristics

Because of the results of the conditioning process, the differences in personality characteristics between the various groups proved to be highly provocative but extremely complex.

The factor of anxiety figured prominently in all subgroups divided according to attitude toward reinforcement: L-NL; A-L--A-NL; U-L--U-NL. Even though there were no such differences in mean scores for anxiety for the A-U group, there were indications from the intercorrelations of this factor with others that it differentiated the two groups.

The anxiety scores of the A group (low average for both A and U groups) correlated negatively (significant at .05 or .01 levels) with

Factor G--conscientious and rule-bound. No such significant correlations were found in the U group. Since PF-G is the only factor which differentiated these two groups, it would be unwise to place too much emphasis upon it but in conjunction with the differences in anxiety noted between the other subgroups the intercorrelational differences in the A-U groups may serve as confirmation of the complex role of anxiety in this experimental situation.

In the groups in which differences in anxiety played a major role--L-NL; A-L--A-NL; and U-L--U-NL--some explanation may be attempted. Low anxiety was associated with the groups which did not like the reinforcement, regardless of whether they were aware or not. An average amount of anxiety characterized the groups which liked the reinforcement. In previous experiments it had been hypothesized that anxiety was characteristic of those who condition. As noted in the review of the literature this has been as often not corroborated as corroborated. An explanation for these conflicting findings might be found in the evidence from this experiment that the Ss who conditioned had average scores on anxiety, not high scores. If the previous investigators dichotomized their groups into low and high anxious Ss, perhaps the latter did not condition because of high anxiety. If the experimenter adopted the procedure of correlating conditioning scores with anxiety scores which were normally distributed, the high anxiety scores may also have disturbed whatever correlation trends may have existed in the low and medium ranges.

Another avenue of exploration to explain the finding that low anxious Ss did not like the reinforcement and did not condition might be to

consider anxiety in terms of reactivity. Low anxious persons are low reactors who keep themselves calm by exercising control over the environment. In the present experimental situation such Ss might be less favorably disposed toward reinforcement administered by the experimenter. But perhaps the main reason for the difference between the results of this experiment and previous ones is the fact that the Ss in the present experiment were divided according to attitude alone and according to attitude and awareness. Along these dimensions several other personality factors differentiated the groups in addition to anxiety. Anxiety alone may not be the differentiating factor.

In analyzing Ss according to attitude toward the reinforcement, it was discovered that Ss who did not like the reinforcement and, therefore, did not condition, manifested personality characteristics quite different from those who did condition. Those who did not condition may be described as above average in emotional maturity, independence; they are socially bold, venturesome, somewhat shrewd and penetrating, relaxed, self-assured but at the same time socially precise. In addition, Ss who did not like the reinforcement and were also unaware tended to be more venturesome and socially bold and in this same unaware group those who liked the reinforcement tended to be very shy and timid.

Some comparisons between these findings and other studies may be ventured. It is not possible to make direct comparisons because no other study has employed the same instruments to assess personality characteristics. Most have used EPPS. If emotional maturity and independence may be considered analogous to autonomy and self-esteem, the present findings that

these were negatively related to conditioning would support the findings of Gelfand (1962) and Vestre (1962) and also the work of Marlowe (1963) and Crowne and Strickland (1961) who investigated need for approval.

The fact that other investigators found conflicting evidence when investigating isolated variables and the fact that in the present experiment several personality characteristics and complex interactions differentiated conditionable groups may indicate that in investigating attitude and the intricate relationship of personality variables which correspond to it we may learn a great deal about the effect of verbal reinforcements in a conditioning situation.

CHAPTER VI

SUMMARY

In a verbal conditioning experiment 120 Ss, who had previously taken Cattell's 16 PF Questionnaire, Nicolay-Walker PRS, and WAIS Attention Test, were divided into an experimental and two control groups. Ss in the experimental group were reinforced with "mm hmm" for the emission of "I" and "We" pronouns. For analysis the experimental group was subdivided on the basis of awareness of the correct contingency and attitude toward the reinforcement.

Conditioning scores analyzed according to Edwards Trend Analysis indicated that the group (N=30) which liked the reinforcement conditioned ($p < .01$) regardless of awareness or unawareness of the correct contingency.

The analysis of personality characteristics revealed that the factor of anxiety, which bore a complex relationship to other variables distinctive for each group, differentiated those Ss who did not like the reinforcement from those who did. The former were characterized by less than average anxiety and positive correlations of this measure with conditioning scores; the opposite trend held for Ss who liked the reinforcement.

It was suggested that in future research attitude toward reinforcement and intercorrelations of personality characteristics be studied in order to define more precisely the complex role of anxiety in verbal conditioning experiments.

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Experimental Schedule

Name _____

1. voted SWYITH
2. read ITWYHS
3. achieved HIWTSY
4. forgave HTWSIY
5. hinted TYHWIS
6. received IYHWST
7. demanded ITSHYW
8. discarded WITSHY
9. agreed YWITSH
10. sang THSIWY
11. rode SIWTEH
12. said TWYIHS
13. spoke HSTIWI
14. talked STIWIYH
15. washed TIWIYHS
16. quit THYSIW
17. painted YWIHST
18. pulled SHYTIW
19. planted HYWSTI
20. played TSHIWI
21. poured ISHTWY
22. predicted WTSIYH
23. waited STHIWI
24. showed TISWYH
25. flew IYSWHT
26. followed WHTYSI
27. forgot YSIHTW
28. recognised WHSYTI
29. remembered YSTHIW
30. made YTHISW
31. used HISWTY
32. mixed SWTYIH
33. built TYIHWS
34. occupied ITSWYH
35. ordered WITYHS
36. tabulated IWSTYH
37. taught WYTIHS
38. replied YHIWST
39. trusted HSWYTI
40. preserved SYWHTI
41. awoke YITWHS
42. descended IWTYHS
43. wrote TYHSIW
44. drank IYTWSH
45. smiled WHIYTS
46. repeated HTISWY
47. ate ISTWYH
48. caught WTIYHS
49. guided SIYTWH
50. hunted TWSIYH

51. inspected ITWSYH
52. closed SYHTIW
53. joined WIYTHS
54. consoled WIYHST
55. consulted YWHSTI
56. cooperated HYSTIW
57. decided SHTIWI
58. gave TSIWIYH
59. looked HWYSTI
60. explored TSHYWI
61. lost WSYTHI
62. stood YSWHIT
63. sent YHWSTI
64. entered WYSITH
65. offered STWHYI
66. persuaded TIYSHW
67. quoted IHSYWT
68. raised WSTHYI
69. won IWHTSY
70. presented HWIYST
71. turned STYHIW
72. waved TIHSWY
73. approached IYHSTW
74. loved WHSTIY
75. sewed HYWITS
76. answered SHYWIT
77. pointed YIWHST
78. dressed YHTWIS
79. served HSYTIW
80. noticed HSIYWT
81. stopped HTYSWI
82. listened SIHTYW
83. wondered TWSIHY
84. reached YTISHW
85. jumped YWHIST
86. slept SHTYIW
87. liked TSIHWY
88. knocked HYSWTI
89. located IHWSYT
90. threw YSTIWH
91. climbed HTIWYS
92. thought SIWYHT
93. walked WYHSTI
94. ran IWYHST
95. laughed YHSTIW
96. saw TWYHSI
97. heard IHSTWY
98. felt WSTIYH
99. believed YTIWHS
100. worked SWYHTI

Operant Rate _____

Conditioning _____

Interview Schedule

1. Did you usually give the first sentence which came to your mind? _____
2. How did you go about deciding which of the words to use? _____
3. Did you think you were using some of the words more often than others? _____
Which words? _____
Why? _____
4. What did you think the purpose of this was? _____
5. While going through the cards did you think that you were supposed to make up your sentences in any particular way? _____
6. Did you get the feeling that you were supposed to change the way in which you made up your sentences? _____ How? _____
7. _____
(If subject mentions E's saying "mm-hmm" 7-9 are not asked.)
7. Were you aware of anything about me? _____ (If yes, 8 not asked)
8. Were you aware that I said anything? _____ (Control ends here)
9. Actually I did occasionally say "mm hnn." Thinking back now to when you were going through the cards, do you remember my saying "mm hnn"? _____
10. What did my saying "mm hnn" mean to you? _____
11. Did you try to figure out what made me say "mm hnn" or why or when I was saying "mm hnn"? (If S says no, question 14 follows.) _____
12. How hard would you say that you tried to figure out what was making me say "mm hnn": very hard; fairly hard; not hard at all. _____
13. What ideas did you have about what was making me say "mm hnn." _____
14. Would you say that you wanted me to say "mm hnn" very much; some; didn't care one way or another. _____
15. While going through the cards did you think that my saying "mm hnn" had anything to do with the words that you chose to begin your sentences? _____
What? _____
16. Did you ever have the idea that I was saying "mm hnn" after sentences beginning with I or WE? _____

(If S verbalizes a correct contingency at any time during the interview, the above schedule is discontinued and the following questions are asked.)

- a. Is that something that you were actually aware of while going through the cards or is it something you thought of just now? _____
- b. Do you remember when, while going through the cards, that idea occurred to you? _____
- c. Did the fact that you realized this have any effect on the way in which you made up your sentences? In other words, did you try and make up your sentences in that way because I was saying "mm hnn"? _____

APPENDIX III

BIPOLAR DESCRIPTIONS OF SOURCE TRAITS FOR CATTELL'S 16 PERSONALITY FACTOR
QUESTIONNAIRE - FACTORS A THROUGH Q₄

	<u>High Score</u>	<u>Low Score</u>
Factor A:	Cyclothymia, (Warm, Sociable) Good Natured, Easy Going Ready to Cooperate Attentive to People Soft-Hearted, Kindly Trustful Adaptable Warm Hearted	Schizothymia (Aloof, Stiff) Aggressive, Grasping, Critical Obstructive Cool, Aloof Hard, Precise Suspicious Rigid Cold
Factor B:	Intelligence Conscientious Persevering	Mental Defect Of Lower Morale Quitting
Factor C:	Emotional Stability or Ego Strength Emotionally Mature Emotionally Stable Calm, Phlegmatic Realistic about Life Absence of Neurotic Fatigue Placid	Dissatisfied Emotionality Lacking in Frustration Tolerance Changeable (in attitudes) Showing General Emotionality Evasive (on awkward issues and in facing personal decisions) Neurotically Fatigued Worrying
Factor E:	Dominance or Ascendance Independent Minded Hard, Stern Solemn Unconventional	Submission Dependent Kindly, Soft-Hearted Expressive Conventional
Factor F:	Surgency Enthusiastic, Happy-go-lucky Talkative Cheerful Serene Quick and Alert	Desurgency Glum, Sober, Serious Silent, Introspective Depressed Concerned, Brooding Languid, Slow

Factor G:	Character or Super-Ego Strength Persevering, Determined Responsible Consistently Ordered	Lack of Rigid Internal Standards Quitting, Fickle Frivolous Relaxed, Indolent
Factor H:	Farmia Adventurous, Likes Meeting People Active, Overt Interest in Opposite Sex Responsive, Genial Friendly Carefree	Threctia Shy, Withdrawn Retiring in Face of Opposite Sex Aloof, Cold, Self-Contained Apt to Be Embittered Careful, Considerate
Factor I:	Premia Demanding, Impatient, Subjective Dependent, Seeking Help Acts on Sensitive Intuition Attention-Seeking	Harria Realistic, Expects Little Self-reliant, Taking Responsibility Acts on Practical, Logical Evidence Self Sufficient
Factor L:	Protension Jealous Self-sufficient Suspicious Withdrawn, Brooding Tyrannical	Relaxed Security Accepting Outgoing Trustful Open, Ready to Take a Chance Understanding and Permissive
Factor M:	Autia Unconventional, Self-absorbed Frivolous, Immature in Practical Judgment Interested in Art, Theory, Basic Beliefs Imaginative, Creative	Praxernia Conventional, Alert to Practical Needs Sound, Realistic, Dependable, Practical Judgment Interests Narrowed to Immediate Issues No Spontaneous Creativity
Factor N:	Shrewdness Sophisticated, Polished Socially Alert Exact, Calculating Mind Insightful Regarding Self Insightful Regarding Others Ambitious, Possibly Insecure	Naivete Simple, Unpretentious Socially Clumsy and "Natural" Vague and Sentimental Mind Lacking Self-Insight Unskilled in Analyzing Motives Content with What Comes

Factor O: Guilt Proneness
Worrying, Anxious
Depressed
Sensitive, Tender, Easily
Upset
Strong Sense of Duty

Confident Adequacy
Self-Confident
Cheerful, Resilient
Tough, Placid

Expedient

Factor Q₁: Radicalism

Conservation of Temperament

Factor Q₂: Self-Sufficiency

Group Dependency

Factor Q₃: High Self-Sentiment Formation
Controlled, Exacting Will Power

Poor Self-Sentiment Formation
Uncontrolled, Lax

Factor Q₄: High Ergic Tension
Tense, Excitable

Low Ergic Tension
Phlegmatic, Composed

PERSONAL REACTION SCHEDULE

Anxiety Type M (Motor Tension)

Type M anxiety is characterized by concern with external achievements coupled with physical tension which acts as a defense against feelings of inadequacy. When frustration occurs, energy is channeled somatically instead of psychically. Type M anxiety results in hyperactivity, physical and mental restlessness, or jumpiness.

Anxiety Type O (Object)

Type O anxiety is characterized by concern that external demands and perceived expectancies may be over-whelming and one may suffer harm. It represents a projection or rationalization of one's possible personal inadequacy. It results in a magnification of personal problems out of proportion to objective reality. The emphasis here is on the external as a source of uncertainty or unrest.

Anxiety Type P (Personal Inadequacy)

Type P anxiety is characterized by concern that one may not be capable of meeting the difficulties of life. The person himself feels inadequate and the inadequacy lies within himself. There is a certain helplessness and self-evaluation which may give rise to guilt feelings. The focus of the uncertainty is on one's own inadequacy.

APPROVAL SHEET

The thesis submitted by Sister M. Austin Doherty, O.S.F. has been read and approved by three members of the Department of Psychology.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

May 28 1965
Date

Ronald E. Walker
Signature